London County Council

THE CLINICAL AND ADMINISTRATIVE ASPECTS OF VULVO-VAGINITIS IN CHILDREN

Report of Departmental Committee appointed by the County Medical Officer of Health and School Medical Officer.

PUBLISHED BY THE LONDON COUNTY COUNCIL,
and may be purchased, either directly or through any Bookseller, from
P. S KING AND SON, LIMITED,
14, GREAT SMITH STREET, VICTORIA STREET, WESTMINSTER, S.W.1,
Agents for the sale of the Publications of the London County Council.
1938

No. 3362. Price 6d. Post Free 7d.

London County Council

THE CLINICAL AND ADMINISTRATIVE ASPECTS OF VULVO-VAGINITIS IN CHILDREN

Report of Departmental Committee appointed by the County Medical Officer of Health and School Medical Officer.

1000 (M&C. 11299) 15-8-38—8497.

FOREWORD

Outbreaks of vulvo-vaginitis occur from time to time amongst children in hospitals or in other institutions established for their care. Such outbreaks naturally give rise to grave administrative difficulties, and are a source of great anxiety to those responsible for the health of the children.

The need for full knowledge of the disease and for well-informed advice as to its management is manifest, and with this in view a Departmental Committee was appointed to consider and report upon the different aspects of the problem. The report of this Committee is contained in this pamphlet.

FREDERICK MENZIES,
County Medical Officer of Health and
School Medical Officer.

London County Council

Report of Departmental Committee appointed by the County Medical Officer of Health and School Medical Officer on the Clinical and Administrative Aspects of Vulvo-Vaginitis in Children.

The members of the Departmental Committee were :—

P. J. Watkin, M.C., M.R.C.S., L.R.C.P.	Medical Superintendent, Lambeth L.C.C. Hospital (Chairman).
D. Kathleen Brown, M.B., B.S., M.R.C.S., L.R.C.P.	Medical Officer in charge of V.D. Department, South London Hospital for Women.
	Medical Officer, V.D. Department (female), Guy's Hospital.
	Medical Officer, Children's Medical Home, Waddon, Croydon.
Lt.-Col. E. T. Burke, D.S.O., M.B., Ch.B.	Director, Whitechapel Clinic, Consultant Venereologist.
R. Cruickshank, M.D., Ch.B., D.P.H.	Pathologist, Group Laboratory, North-Western L.C.C. Hospital.
Letitia D. Fairfield, C.B.E., M.D., Ch.B., D.P.H.	Senior medical officer, London County Council.
G. W. Goodhart, M.A., M.D., B.Ch., M.R.C.P.	Pathologist, Group Laboratory, St. Mary Abbots L.C.C. Hospital.
R. Lightwood, M.D., F.R.C.P., D.P.H.	Consulting pædiatrist (L.C.C.).
	Assistant physician for children, Westminster Hospital.
	Physician to out-patients, Hospital for Sick Children, Great Ormond Street.
D. N. Nabarro, M.D., B.Sc., F.R.C.P., D.P.H.	Director, Pathological Department and Bacteriologist and Medical Officer in charge, V.D. Department, Hospital for Sick Children, Great Ormond Street.
	Physician for congenital syphilis, St. John's L.C.C. Hospital.
Gladys M. Sandes, M.B., B.S., F.R.C.S.	Consultant for venereal diseases, St. Margaret's L.C.C. Hospital.
	Honorary surgeon, London Lock Hospital.
A. Gordon Signy, M.B., B.S., M.R.C.S., L.R.C.P.	Pathologist, Infants' Hospital, Vincent Square.

Terms of reference to the committee

To investigate the clinical aspects of the morbid conditions included under the designation vulvo-vaginitis, and to consider the means necessary to prevent the spread of the disease in hospitals, nurseries, and schools in which children may be resident.

Symptoms.—The inflammation and œdema of the urethral meatus and hymen are very typical of gonococcal infection. After careful swabbing of the vulva, a probe passed into the urethra shows pus in the majority of cases.

The pus spreading back over the perineum may cause a rectal infection. The anus is red and moist. There is sometimes mucus on the fæces. The first rectal test may be negative, but if the vaginal discharge does not clear, the tests should be repeated at intervals, otherwise an infection may be missed and then re-infection from the rectum may occur later.

The exact limits of the incubation period are difficult to determine. In the great majority of cases it is three to four days but may in rare instances be longer.

There may be a complaint of vaginal discharge with burning or irritation of the vulva in young children, discomfort on walking, or frequency and pain on micturition. The lack of symptoms is often surprising, particularly in older children, and the mother brings the child to the doctor because the discharge is found on the clothing.

In a chronic case there is a slight inflammation of the vulva and vagina with usually a scanty discharge which may be thin, purulent, or muco-purulent. The mucous membrane of the vulva is injected particularly in the deep clefts between hymen and labia minora and just within the urethral meatus. The hymen is frequently torn and stretched. The cervix should be examined in these cases

In an acute case the diagnosis can readily be made on clinical signs alone.

The vulva is hyperæmic or acutely inflamed, and bathed in pus which oozes from the vagina with any expulsive effort on the part of the child. The pus may be thick or thin, yellow or greenish. It is rarely blood-stained and never so offensive as in the case with foreign bodies in the vagina. In neglected cases there is excoriation of the labia majora, groins, and inner surfaces of thighs with adherent crusts of dried pus.

Bacteriological diagnosis.—The closest co-operation between the clinician and the bacteriologist is necessary, especially in doubtful cases. At the same time, too exclusive dependence on bacteriological findings is to be deprecated. In acute cases the clinical appearances of gonorrhœa should leave little doubt as to the diagnosis.

Collection of material for bacteriological diagnosis

The manner in which material for bacteriological examination is collected is of great importance. Many failures to make a correct diagnosis are due to the fact that bacteriologists are supplied with material taken by unsuitable methods or by unskilled workers. Swabs should be taken only by a clinician expert at the task and never delegated to a member of the nursing staff unless she has been specially instructed. No attempt should be made to work single-handed. At least one assistant is essential to hold the child still in the correct position.

The child is placed in the dorsal position with the knees drawn up and the thighs separated as far as possible without hurting the child, the external genitalia being exposed in a good light. Any superficial discharge is removed with wool and the labia separated with gloved thumb and forefinger of the left hand.

Vaginal swab

Two swabs are taken with wooden or wire applicators* round which a thin layer of good quality sterilised cotton wool is firmly wrapped. The probe must be *passed well into the vagina* and withdrawn with some discharge on it. The first swab is used to make a thin even smear on a clean glass slide; the film is allowed to dry in air and is then preferably "fixed" by being passed through a gas or spirit flame several times, after which it is wrapped in paper and placed in the special slide box supplied for the purpose. *Smears should never be packed while still moist.* The other swab is used for inoculation of the culture medium which may be done at the bed-side, or the swab may be transported as quickly as possible to the nearest laboratory.

Urethral and rectal swabs

Smears and swabs for culture should be taken from these sites in proved gonococcal cases, or in patients suspected of past or present gonococcal infection or where there is any other special indication. Swabs may be taken from the urethra in a manner similar to vaginal swabs. The child should not have passed urine

* Sometimes a platinum loop, of 24 standard wire gauge which is easier to manipulate, is preferred, but care and experience in its use are required to avoid injury to the mucous membrane.

within an hour, and preferably longer, of being examined. Swabs of rectal mucus or muco-pus should be examined where there is clinical evidence or suspicion of rectal infection.

Methods for the identification of the infecting micro-organism

It is generally agreed that for primary diagnosis both smears and cultures should be examined wherever possible. This is particularly essential in the case of suspected gonococcal infections since (*a*) Gram-negative diplococci other than the gonococcus are occasionally present in the vagina, and (*b*) a diagnosis of gonococcal infection on smear alone will not be accepted in any medico-legal proceedings. However, on finding typical Gram-negative diplococci in the smear of a purulent vaginal discharge, a preliminary report should be sent (or telephoned) in some such form as this: "Gram-negative intra-cellular and/or extra-cellular diplococci morphologically resembling gonococci are present in smear." It is helpful if, on receipt of this preliminary report, the clinician sends a repeat smear and swab for examination at the laboratory. A further report is sent on the result of the cultural examinations.

The gonococcal complement fixation test

Most workers seem agreed that the complement fixation test is usually negative in the early stages of a gonococcal infection, and that therefore it plays little part in the early diagnosis of vulvo-vaginitis in children. The evidence as to its value in the later stages of infection is still rather conflicting. It is certain, however, that the test should not be regarded as an alternative to careful examination of films and cultures from the mucous membranes, especially in the early stages of an inflammation. Definite cases of gonococcal vulvo-vaginitis may have a negative complement-fixation test throughout the attack.

Details of the laboratory methods recommended for use in the identification of the infecting micro-organism are given in Appendix II.

Complications.—Cervicitis is one of the common causes of recurrence, and it is possible that it is present in the majority of cases in the early stages. The cervix should not be examined as a routine, but only in those cases which fail to clear up with the usual methods of treatment, or which relapse after treatment ceases.

Ascending infection through the internal os, causing endometritis, salpingitis, or pelvic peritonitis, occurs rarely.

Although urethritis is so usual, cystitis is a very rare complication.

Cases of gonococcal conjunctivitis and iritis are very uncommon. They have never occurred as a complication in the series of cases at the Children's Medical Home, Waddon. There have been 4 cases of purulent conjunctivitis, but gonococci have not been found.

The following is a table of complications occurring in 467 cases treated at the Children's Medical Home, 1928 to 1936:—

	No. of cases	*Percentage*
Urethritis	377	80·7
Proctitis	55	11·8
Cervicitis	11	2·3
Warts	4	·8
Endometritis and salpingitis	4	·8
Purulent conjunctivitis (G.C. negative)	4	·8
Teno-synovitis	2	·4
Arthritis	1	·2
Infected eye socket	1	·2

Vulvo-vaginitis and ophthalmia neonatorum

When dealing with infants it should be remembered that vulvo-vaginitis may occur concurrently with gonococcal ophthalmia but not, as a rule, during the first few weeks of life since at this period the vaginal epithelium is of the adult type and the secretion highly acid, conditions inimical to infection with the gonococcus (see Appendix I). Later, a vaginitis in a child with ophthalmia may be overlooked as the eye condition is more serious and attention is focussed on this. Ophthalmia as a secondary complication of gonococcal vulvo-vaginitis is a very rare occurrence.

TREATMENT.—Treatment may be considered under the following headings :—

(i) *General nursing instructions.*
(ii) *General routine.*
(iii) *Local treatment.*
(iv) *Special treatment—*
  (*a*) Vaccine therapy.
  (*b*) Œstrin.
  (*c*) Sulphanilamide and allied substances.

General nursing instructions

(i) The careful nursing of all children collected in hospitals and institutions is of the highest importance in the *prevention* of vulvo-vaginitis. The rules suggested for the " nursing of non-affected children " are set out in Appendix III.

As regards the nursing of children affected with any form of vulvo-vaginitis the following measures are recommended :—

(*a*) Certificated nurses only shall be employed in the care of affected children *until* three negative swabs have been obtained in a period of not less than a week, and the condition is considered to be non-gonococcal on clinical grounds. Nurses employed in the care of affected children must not, while so employed, attend to unaffected children, but they may with suitable precautions attend to adult patients.*

(*b*) Every affected child should have a separate bed-pan or chamber, unless provision is available for efficient sterilization of such utensils after use.

(*c*) Special attention should be paid to the clothing of infected children. When the discharge is profuse, a light pad of non-irritating material is advisable, so as to minimise friction. All infected clothing should be soaked in a suitable disinfectant before being sent to the laundry.

General routine

(ii) General routine should include all procedures likely to help in " building up " the resistance of the patient, and may in certain cases be the most important factor in arresting the infection.

(*a*) In-patient treatment with rest in bed during the acute stage for 1 to 3 weeks (according to the severity of the case) is to be recommended and is essential to relieve the initial soreness of the vulva.

(*b*) Balconies or gardens are recommended in which infants can lie and older children play for most of the day, after the initial period of resting in bed. It should be realised that excessive exercise may have a detrimental effect.

(*c*) The provision (when possible) of some occupation for the children, such as organised games, singing and elementary lessons, all help to prevent the dangers of " idle hands." A nursery governess is of the greatest assistance, as she removes the children temporarily from the care of those in uniform and the association of hospital in the child's mind.

(*d*) A balanced diet is to be desired. Milk, fruit, and fresh vegetables are necessary, and an excess of carbohydrate is to be avoided.

(*e*) Ultra-violet light for use during the winter and for specially debilitated children may be a useful adjunct.

(*f*) Nurses responsible for the care of gonococcal vulvo-vaginitis cases should be specially trained.

Local treatment

(iii) The undermentioned choice of methods of local treatment is suggested.

It is emphasised that no packing of the vagina should be carried out and that, throughout, only non-irritating solutions should be employed.

The vulva should be swabbed with lotion and dusted with a drying powder as often as necessary to keep it free from pus and as dry as possible.

If the discharge is profuse, a Sitz bath may be given as a preliminary to treatment to make the cleansing of the vulva easier.

---

* In hospitals for infectious diseases " barrier nursing " of the case may be substituted at the discretion of the medical superintendent, for removal from a children's ward.

(*a*) Douching.—Douching may be necessary to remove excessive vaginal discharge and may be employed as a routine method of local treatment.

The following solutions may be used :—

Protargol	$\frac{1}{4}$ per cent.	
Tinct. Iodi Mitis	1 drachm to 1 pint.	
Dettol	$\frac{1}{2}$ drachm to 1 pint	Useful in offensive cases.
Solution of Chloramine T. ...	$\frac{1}{2}$ per cent.	

Method.—A rubber catheter may be attached to a douche-can or to a Higginson's syringe. Solutions (as above) may be used conveniently at 80° to 100° F.

It is suggested that alternation of the solutions used is advisable every two weeks.

(*b*) Swabbing.—Opinion differs as to the value of swabbing or painting the vagina. Some authorities recommend it as a routine treatment to be applied except when it causes pain or the child is very nervous. Others restrict its use to cases where other treatment has proved ineffective and to very small infants, while one authority considers other forms of treatment adequate, and does not employ it at all.

If carried out, one of the undermentioned solutions should be used, applied to the vagina on dressed throat swabs or wooden applicators. Dressed Playfair's probes may be used for the purpose in older children.

10 per cent. protargol in glycerin.
50 ,, ,, Milton in glycerin.
5 ,, ,, mercurochrome in glycerin.

(*c*) Urethral Treatment.—Here again practice differs. Routine swabbing or painting with 5 per cent. protargol or 1 to 2 per cent. silver nitrate is recommended by some when the canal is involved unless contra-indicated as above. Other authorities depend upon alternative forms of treatment.

(*d*) Rectal Treatment.—Swabbing if used at all should be restricted to cases in which the rectum has been found to be infected with the gonococcus and carried out with the greatest care, but some authorities are not in favour of this form of local treatment of the rectum.

It should be emphasised that probes should be *carefully and evenly* dressed and with the best quality cotton wool.

(iv) Particulars of special treatment are set out below :—

Special treatment

(*a*) Vaccine Therapy.—A reliable stock gonococcal vaccine may be used, but the use of this form of therapy appears to be infrequent and some authorities are definitely opposed to it. It has been recommended in chronic cases where there have been relapses and in the rare cases of tenosynovitis or arthritis. It should never be given during the acute stage.

(*b*) Œstrin.—Many observers have reported favourably on the use of œstrin. Œstrin can be given by mouth, by injection or in the form of suppositories, the dosage being approximately five times as great by mouth as by injection. The oral method is probably to be preferred as children do not object to it, and the daily insertion of a vaginal suppository is considered undesirable and a procedure to be avoided, if possible.

The daily dose is 3,000 to 6,000 units, according to the size of the child, and it may be given at one time, say, every morning. The character of the discharge, macroscopic and microscopic, should be noted every day. The purulent gonococcal discharge soon gives place to one containing many squamous epithelial cells and Döderlein's bacillus but no gonococci.

The duration of the treatment varies from a few weeks to a few months. If the urethra or rectum (which are not affected by the œstrin) is found to be infected, treatment should be applied as above (section iii (*c*) and (*d*)).

Relapses may occur after or even during a course of œstrin and are then usually found to be due to a urethral or rectal infection ; they usually clear up

quickly with œstrin and the associated treatment of the urethra or rectum. It is important that the change in the character of the discharge mentioned above is brought about.

Unpleasant effects such as engorgement of the breasts, vaginal hæmorrhage, and especially masturbation, have been ascribed to the use of œstrin by some observers. The great value of the drug is, however, firmly established in the view of many experienced clinicians.

(*c*) Sulphanilamide and Allied Substances.—Sulphanilamide and allied substances have been used in some cases with encouraging results, but it is too early at this stage to assess fully the value of this treatment.

Attention is drawn to the very varying degree of efficiency in the preparations of both œstrin and sulphanilamide now on the market. If good results are to be obtained, the selection of a reliable preparation is essential.

Relapses.—The tendency to bacteriological and clinical relapse is one of the features of this disease. It is important to recognise the fact that these relapses may sometimes be of very short duration and pus may be present only for a few hours. A test may be positive on one day and, when repeated the following day for confirmation, a negative result may be obtained.

There may be no clinical signs in these latent cases, but the gonococci may be found in apparently clear mucus.

Relapses may be due to re-infection from an insufficiently treated urethra, or from the cervix or rectum, but masturbation is a contributory factor. It is the persistence of this habit, after treatment has ceased, which makes a clinical diagnosis of cure very difficult in many cases. Reliance on the bacteriological reports is essential.

The influence of bad hygienic conditions at home, of tight and dirty clothing and of masturbation in prolonging an unhealthy appearance of the genital parts should not be forgotten. From 11 or even 10 years onwards, the physiological changes of puberty may be responsible for intermittent congestion of the parts, moisture and mild leucorrhœa. None of these conditions should be mistaken for a genuine relapse.

It is impossible to arrive at a correct diagnosis in such cases without the help of an experienced bacteriologist. Films and cultures (the latter being the more important in chronic or latent cases) must be taken.

It is of importance to remember the possibility of *cross-infection and re-infection* when considering apparent relapses. Very great care is required to prevent convalescent cases of vulvo-vaginitis in a hospital being re-infected by children still in the acute stage. It may also happen that a child discharged from hospital may be re-infected in her own home (perhaps by the original source of infection) and then brought back to hospital with a complaint that she has relapsed.

The intractable character of gonorrhœal vulvo-vaginitis is shown by the long period of treatment and observation required, *e.g.*, up to two years, even when the case is in skilled hands from the beginning.

When is the Child Cured ?—Of all the vexed questions associated with vulvo-vaginitis, none has given rise to greater controversy than this : when is the child cured ? The marked tendency to bacteriological and clinical relapse, the uncertainty of finding the gonococcus in chronic discharges and the obvious difficulty of proving a negative, lead to the necessity for extreme caution in giving a certificate of cure. The query cannot, however, be evaded. Anxious parents must be reassured, schools must be advised when they can safely re-admit pupils, and hospitals want to know when they may finally discharge patients.

The problem is peculiarly difficult of solution because the clinician is not only required to determine whether a child patient is, at any particular moment, free from infection, but also when the liability to relapse has ceased.

As against an excessively pessimistic attitude it is pointed out :—

(i) That there is no direct evidence of gonococcal infection contracted in childhood lasting into adult life. Large numbers of patients who have suffered

from gonococcal vulvo-vaginitis have now been followed up for many years and no such case is known. Moreover, the previous history of the thousands of adult patients who have attended the V.D. clinics during the past twenty years has been recorded with care and no such tendency has been noted.

(ii) Exacerbations commonly occur in the early stages after treatment has ceased, although rarely after three months.

Criteria of cure.—*Criteria of cure should be negative tests (films, cultures, and gonococcal complement fixation) for a minimum of four months after cessation of all treatment. During this time the patient should be under observation at frequent intervals.*

Procedure for tests of cure

Daily inspection of the vulva is advisable for the first three months after suspension of treatment in view of the very short duration of some relapses. (This can be done quite adequately by an intelligent mother after the first few weeks.) Normally the vulva clears up completely after treatment, but, in a few cases, there may sometimes be a persistent redness and slight discharge which is not pathological.

After treatment has been discontinued a full set of films and cultures should be made from vagina, urethra, and rectum (if considered advisable). For a minimum of four months vaginal and urethral swabs should be taken at weekly intervals for the first three weeks and subsequently at intervals of two or three weeks. Tests from the rectum need not be repeated as a routine unless it has been infected. The final set of swabs and cultures should be taken after a provocative dose of vaccine administered 24 hours previously.

The place of the complement fixation test among the criteria for cure of gonococcal vulvo-vaginitis is still undecided. When performed in a laboratory where such tests are being done weekly on a considerable scale and under well controlled conditions—the Council's laboratories come into this category—the test has been helpful. When both the bacteriological and the serological tests are negative, cure may be assumed. When the bacteriological test is negative but the complement fixation test remains positive for more than six weeks, persistence of some hidden focus of infection may be suspected. Such persistently positive tests are rare. Change to a negative reaction is sometimes accompanied or followed by a recurrence of the vaginal discharge.

When a period of six months has elapsed after cessation of treatment without obtaining a "positive" result (bacteriological or serological), or definite clinical evidence of vulvo-vaginitis, there can, in the opinion of the writers, be no object in continuing observation of the patient. Such continuous observation will tend to perpetuate anxiety in those responsible for the child, to keep up bad habits if they exist, and to fix in the memory an unfortunate experience.

(B) Non-gonococcal Vulvo-vaginitis

This condition is not uncommon in girls between the ages of 2 and 7 years. It becomes relatively infrequent after that age and appears to be very rare after the age of 10 years.

The conditions which may give rise to vulvo-vaginitis, or are found in association with it, are of a very diverse character. They are as follow :—

(I) General Causes.

(*a*) Acute specific infections :—

(i) It may develop as a prodromal symptom of the exanthemata, *e.g.*, of chickenpox and measles, or as a sequela, *e.g.*, of scarlet fever.

(ii) It may occur during the course of general acute infections, particularly pneumonia ; and has also been observed in attacks of influenza and possibly in ordinary coryza.

(*b*) General debilitating diseases : It occasionally occurs in the course of general debilitating diseases and has been observed in the anæmias.

(*c*) Secondary to acute throat infections : It may be secondary to acute throat infections, most commonly streptococcal. It also occurs in association with cases of diphtheria and of Vincent's angina.

(II) Local Causes.

(*a*) Foreign bodies, *e.g.*, safety pins, marbles, gauze-swabs, etc., in the vagina.

(*b*) Direct infection from fingers of mother, nurse, etc., and by towels and clothing or by direct contact with dirt (as in children with inadequate clothing).

(*c*) Secondary to irritation, congestion or inflammation in adjacent organs, *e.g.*, in association with thread worms, chronic constipation, appendicitis (acute or chronic) and infection of the renal tract.

(*d*) Direct irritation of the parts by tight clothing or masturbation causes a local hyperæmia and predisposes to invasion of organisms. The tendency has also been noted in neglected children and in those especially difficult to keep clean, *e.g.*, spastic cases.

Clinical signs

A differential diagnosis between the various types of vulvo-vaginitis cannot be made without bacteriological tests but certain clinical signs are highly suggestive of certain causes. In " diphtheroid infections," for example, redness of the vulva is present and discharge, if present, is scanty. Discharge due to the presence of foreign bodies is characteristically blood stained and offensive. Staphylococci usually produce a thick creamy discharge, whilst that caused by the streptococcus is thinner and colourless. *B. coli* may give rise to an offensive discharge with a characteristic odour. The vaginal discharges which occur occasionally at the onset of a general infection may simulate any of these characteristics.

Bacteriological diagnosis

The same precautions should be adopted in collecting material as in cases of gonococcal vulvo-vaginitis (*v.s.*).

A large variety of organisms have been found in smears or cultures from vaginal discharge, either singly or in combination. The relative frequency of the infecting organisms will very probably vary according to the centre at which a series of cases is studied. For example, among 71 cases examined at the Hospital for Sick Children, Great Ormond Street, by Dr. Wood, non-hæmolytic streptococci (mostly enterococcus) were recovered from 51, *B. coli* and a typical coliform bacillus from 36, anærobic Gram-positive cocci, *S. albus* and diphtheroids from a quarter to half the cases, while the hæmolytic streptococcus was isolated from 10 and *S. aureus* from only two patients.

In fever hospitals, the most frequent causal organism is the hæmolytic streptococcus, most of the infections developing as complications of scarlet fever or tonsillitis. Rarely *C. diphtheriæ* produces a true diphtheria of the vagina although virulent strains may be present in the vagina without producing diphtheritic infection. Other organisms like the pneumococcus, *H. influenzæ*, Gram-negative cocci other than the gonococcus and the tubercle bacillus seem occasionally to be responsible for vulvo-vaginitis. *Trichomonas vaginalis* does not apparently produce infection in the child.

While organisms like the hæmolytic streptococcus, *S. aureus* and possibly *B. coli*, which are known or potential pathogens, do frequently initiate infection in a healthy vagina, it is unlikely that saprophytic organisms like the enterococcus and diphtheroids do so and their predominance on culture may mean that they have supplanted or masked the original infecting organism. They may, however, perpetuate an infection arising from other causes.

An important point to which attention should be drawn is the very low infectivity of non-gonococcal vulvo-vaginitis. Familial spread is occasionally reported, but epidemics of vulvo-vaginitis in schools and hospitals, or indeed the infection of any one child by another, appears to be very uncommon. The presence of a focus of sepsis (especially of the hæmolytic streptococcus) obviously makes any child an undesirable occupant of a ward or dormitory, but there is apparently little danger of the spread of the vulvo-vaginitis as such.

Treatment

The treatment of the non-gonococcal forms of vulvo-vaginitis calls for considerable judgment. Many of these cases are of a very mild character and require little or no treatment except baths and local cleanliness and removal of any causal factor. Indeed the great danger is over-treatment, for prolonged swabbing and douching may not only keep up a vaginitis but actually increase it.

Prolonged confinement to bed is very harmful. It lowers the general health and leads to masturbation.

The more severe infections should be treated on the same lines as the gonococcal cases, including œstrin therapy; there are all grades between these severe cases and the patients with slight persistent discharge. Treatment varies, therefore, from simple bathing to the complete régime of the gonococcal case.

In a very small number of children the discharge proves extremely persistent and may fail to clear in twelve months or more.

The following have been found of value in troublesome infections :—

A short course of daily irrigations with lotions of iodine or chloramine T. may be given. If the patient is treated at home a nurse should visit the home and irrigate twice daily for a week and once daily for a second week. Further treatment is seldom needed.

Any septic focus present should be dealt with, *e.g.*, tonsillectomy, dental extractions, or treatment for pyelitis or cystitis may be required. It should be made clear to the parent that alleviation of the vulvo-vaginitis does not always follow operation quickly, especially if the child is in a debilitated state of health, due, perhaps, to prolonged sepsis.

Convalescence in a suitable environment is invaluable in those cases which will not clear completely or tend to relapse, but it presents practical difficulties. Few, if any, convalescent homes welcome children with a recent history of vulvo-vaginitis whatever the cause. It may, however, be possible to find accommodation for the child in a home for adults or to board her out in a suitable family where there are no other female children.

Criteria of cure

The great majority of cases clear completely after 2–3 weeks' treatment, but it is advisable to keep observation on the child for 2–3 weeks after the discharge has ceased as recurrences are not unknown. In hæmolytic streptococcal infections, the tendency to relapse may last for a considerable length of time.

In view of the alarm caused by any vaginal discharge, children allowed to return to a residential school or institution should be examined at weekly or fortnightly intervals for two months after their return.

Administrative Aspects

The administrative aspect of the problem is of great importance as any authority or organisation undertaking the care of children, sick or healthy, is faced with two serious obligations :—

(*a*) to protect non-infected children from the possibility of infection with the disease, and

(*b*) to detect, isolate, and treat any case of vulvo-vaginitis occurring in a child for whom it is responsible.

The administrative measures found necessary to ensure these ends will vary greatly with local conditions and also as between children who are sick and those who are healthy.

For the protection of sick children, the writers have suggested certain instructions (see appendix III) which have, with slight variations, been in operation in the London County Council's hospitals for over two years. During this time no spread of the disease has occurred and it is felt that the precautions are adequate. The plan of swabbing all female children on admission to hospital was considered and rejected, on the grounds (*a*) that the Council had such a large number of child patients that the procedure would be burdensome, (*b*) that gonococcal infection

is now shown to be extremely infrequent, and (*c*) that it gives no real security and would in no way obviate the necessity for other precautions.

As regards healthy children in the Council's residential schools and receiving homes, the staffs are asked to maintain a careful look-out for any sign or symptom of the disease. The children's underclothing and bed linen are watched for evidence of discharge, and any child considered suspicious is at once isolated and swabbed.

At residential establishments for healthy children, the problem of isolation of a suspicious case presents greater difficulty than in a hospital. Many institutions have little or no provision for the accommodation of potentially dangerous material, and the staff are naturally anxious to transfer any " suspicious " child as soon as possible. It has been found, however, that, if too free encouragement is given to the transfer of girls to hospital, children may be sent into hospitals, quite unnecessarily, for conditions which are mere physiological incidents in development, or for transient and quite unimportant redness of the parts. The handling and examination involved in taking a series of tests from any little girl must, of course, be undertaken without hesitation, if necessary, for the benefit of the child or her companions, but it is not a light matter for obvious reasons. Experience has also shown that once a diagnosis of vulvo-vaginitis has been made, even on the most slender grounds, the child is marked out and her record is regarded with suspicion. Hence it is very desirable that residential establishments should be certain that there is some definite evidence of vulvo-vaginitis before transferring a child to hospital for this condition. If, however, definite clinical evidence of vulvo-vaginitis is present, an institution should not be expected to keep a child until bacteriological tests have been made and in no case should they be asked to keep a child who needs treatment.

It is the practice of the London County Council to concentrate in St. Margaret's Hospital all cases of vulvo-vaginitis in which a report of the presence of " organisms morphologically resembling the gonococcus " have been received. Further investigations to confirm the diagnosis are continued after admission, but in the meantime all possibility of spread to non-infected children has been obviated.

Summary

1. Vulvo-vaginitis is a not uncommon disease of early childhood, but in the great majority of cases is non-gonococcal in origin.

2. Gonococcal vulvo-vaginitis is, so far as can be ascertained, very infrequent in London children. It is, however, highly infectious and tends to spread with such rapidity under institutional conditions that very thorough precautions against it are fully justified. In children the disease is very rarely caused by sexual infection, and it is important for the public to realise that it is not accurately described as a " venereal disease."

3. Non-gonococcal vulvo-vaginitis, whether occurring alone or in the course of some other disease, is an unimportant manifestation with a low infectivity. The rare exceptions are examples of infection with the hæmolytic streptococcus.

4. To prevent the spread of vulvo-vaginitis in children's hospital wards, schools, and other institutions, it is essential to carry out (*a*) some form of observation to detect vaginal discharge in any female child admitted, and (*b*) stringent nursing precautions applicable to *all* children.

5. The differential diagnosis of the gonococcal from the other varieties of vulvo-vaginitis rests on clinical and bacteriological grounds. Acute cases of gonococcal vulvo-vaginitis are distinguishable on clinical signs alone, but should be confirmed bacteriologically ; chronic or relapsed cases require expert bacteriological diagnosis. The closest possible co-operation between bacteriologist and clinician is required for the diagnosis and control of the disease.

The material for bacteriological investigation (*i.e.*, vaginal swabs and smears) should be taken only by experienced medical officers or specially trained nurses and transported immediately to the laboratory. Definite identification of the

gonococcus should depend on biochemical reactions as well as cultural and morphological appearances, but a preliminary report may be given on the finding of suspicious organisms in the direct smear.

6. Treatment : The gonococcal form has hitherto proved singularly resistant to treatment and is markedly liable to relapse. Douching and swabbing have their place in treatment and the administration of œstrin is highly recommended by many specialists. Vaccines are useful in selected cases, but never during the acute phase. Sulphanilamide is on trial and the early results have been promising.

For the *non-gonococcal* form simple cleanliness is of primary importance and no other measures may be required.

For the cure of *all* forms of vulvo-vaginitis, attention to the child's general health and hygiene is of major importance. The removal of septic foci elsewhere in the body should receive attention.

7. Criteria of cure : (*a*) In the gonococcal form the liability to relapse makes it difficult to fix a definite standard. A period of not less than 4 months' observation and retesting after cessation of treatment, without clinical evidence of vulvo-vaginitis and without obtaining a positive result to bacteriological or serological tests, is considered the minimum. After a period of 6 months' freedom from positive signs and symptoms, there would appear to be no object in continuing observation.

(*b*) In non-gonococcal forms 2–3 weeks' observation after the clinical symptoms have disappeared is sufficient. Relapses are not infrequent but, except in the hæmolytic streptococcal variety of the disease, are unimportant.

8. The results of the meticulous system of observation and notification in the establishments under the control of the London County Council show that since March, 1935—

(*a*) gonococcal vulvo-vaginitis is rarely admitted to the London County Council's hospitals and has not yet been found in a child admitted to a residential school or nursery,

(*b*) non-gonococcal vulvo-vaginitis is of more frequent occurrence in the general or special hospitals but usually occurs in a mild and easily curable form.

APPENDICES.

I. The vagina in childhood. By R. Cruickshank, M.D., Ch.B., D.P.H.

II. Laboratory methods recommended for use in the identification of the infecting micro-organism.

III. Suggested instructions to staff of hospitals and institutions.

APPENDIX I

THE VAGINA IN CHILDHOOD

By R. Cruickshank, M.D., Ch.B., D.P.H.

It is a matter of common knowledge that, in the adult, bacterial infection of the genital tract usually begins in the cervix, whereas the vagina is first affected in the child. The reasons are to be found in inter-related anatomical and physiological differences in the genital tract before and after puberty.

If the vaginal wall is examined histologically at different periods from infancy to puberty, the following changes may be noted. In the fœtus and new-born child, the vagina consists of a thick many-layered stratified squamous epithelium. In the infant 3 to 4 weeks old, the epithelium is much less thick and at 2 to 3 months has become quite thin. It remains like this until puberty when, often as the first sign of puberty, there is a quite abrupt change to the florid many-layered type of epithelium.

If the vaginal epithelium is examined for glycogen at these various stages, this substance will be found abundantly present in the thick squamous epithelium of the new-born infant and the maiden, but absent or scanty in the thin and delicate epithelium of the child. The presence of glycogen in the vagina fosters bacterial fermentation and a particular Gram-positive bacillus, called Döderlein's bacillus, which is able both to ferment glycogen and resist the high degree of acidity (*p*H 4·0—4·4) which ensues, becomes the predominant and usually sole survivor. Thus, in the infant for 2 to 3 weeks after birth, and in the adolescent girl, there is a thick smooth vaginal epithelium accompanied by a fair amount of a highly acid vaginal "secretion,"* factors calculated to inhibit bacterial invasion. Between these two periods, the thin vaginal epithelium becomes rugated and cryptic while the absence of fermentable glycogen results in a slightly alkaline, very scanty secretion, factors likely to facilitate bacterial infection in the vagina.

The vaginal portion of the cervix shares these characteristics, whereas in the endo-cervix the racemose glandular system is late in developing. Thus, the relative immunity to bacterial infection of the cervix and of Skene's and Bartholin's glands in childhood is probably due to the undeveloped state of these structures, before the onset of puberty.

The appearance of the vaginal epithelium at different stages is almost certainly dependent on the presence or absence of the œstrogenic hormone in the circulation. Œstrin is abundantly present in the new-born child and presumably also in the fœtus, being derived from the maternal circulation via the placenta. After the first week of life œstrin cannot be demonstrated in the infant's urine, and remains absent until puberty when the child's ovaries, stimulated by the pituitary, produce the œstrogenic hormone. By administration of œstrin, the vaginal mucous membrane of the child may be converted from the thin susceptible to the adult resistant type and this is the basis of œstrin therapy in vulvo-vaginitis.

APPENDIX II

LABORATORY METHODS RECOMMENDED FOR USE IN THE IDENTIFICATION OF THE INFECTING MICRO-ORGANISM

Smear

Single stain methods, *e.g.*, methylene blue, should not be used. Some modification of Gram's method is usually recommended for the staining of the thin even film already made at the bedside. Jensen's method, using an aqueous solution of methyl violet, strong Lugol's solution, absolute alcohol for decolorisation and *neutral-red as a counterstain* is recommended. Scudder advises a combination of Gram and Pappenheim stains, because of the affinity of gonococci for pyronin.

Cultivation

Because of the susceptibility of the gonococcus to slow desiccation it is most important that inoculation of the infective material on to a suitable culture medium should be done as soon as possible after it has been obtained. Inoculation at the bedside gives best results, but such a procedure is not always possible. An interval of not more than 3 hours does not appreciably affect the viability of the gonococcus, provided as much material as possible is taken on the swab and the cotton wool stopper is plugged tightly in order to preserve moisture, but any period longer than this will render the specimen worthless.

For cultural purposes it is desirable to have a medium on which all the possible infecting organisms will readily grow and be easily identified and in a container which will allow sub-culture of separate colonies for further identification. A digest agar (*p*H 7·2 – 7·6) containing 5–10 per cent. defibrinated blood (human, horse, rabbit or sheep) in a Petri dish or similar container serves the purpose very well. The plates of media should be freshly prepared and the surface must not be too dry.

The culture medium is incubated aerobically at 36° or 37° C. and examined after 24 hours. While most organisms (hæmolytic and non-hæmolytic streptococci,

* This "secretion," which may be scanty, cheesy, or opalescent in character, is sometimes mistaken in the infant and in the pre-puberty girl for an infective discharge.

B. coli, etc.) can be identified at this time, colonies of the gonococcus may be very small and easily missed in a mixed culture. The plate should therefore be incubated for another day and re-examined. If, after a careful search with a hand lens, no suspicious colonies are seen the plate may be covered with 1 per cent. 4-methyl-phenylene-diamine hydrochloride* (McLeod's oxydase reaction) when colonies of gonococcus quickly turn a deep purple colour, deepening later to black. However, a positive oxydase reaction is not to be regarded as diagnostic of the gonococcus since other Gram-negative diplococci, yeasts, certain sporing organisms, and some coliform bacilli also react, but a *negative test is useful for excluding the gonococcus.*

Criteria for the identification of the gonococcus

To the experienced worker a film showing the characteristic morphology of the gonococcus from a typical colony, on which the oxydase reaction may or may not have been tested, is probably sufficiently diagnostic. But the occasional finding of Neisseria other than the gonococcus, particularly in the vagina of children, calls for additional corroborative tests. These cultural criteria for the identification of the gonococcus are the *correct fermentation reactions and absence of growth on ordinary agar at 22° C.*

For the former, suspected colonies are picked off the original blood-agar plate after 24–48 hours' incubation on to blood-agar or serum-agar slopes (preferably screw-cap) ; ascitic or hydrocele fluid gives better results than horse or other animal serum. From this sub-culture the organism is inoculated on to small tubes containing digest agar *plus* 5–10 per cent. rabbit or guinea pig (not horse) serum *plus* 1 per cent., respectively, of glucose, maltose, lactose, and saccharose *plus* phenol red as indicator and the results read after 24 hours' incubation. Gonococcus ferments glucose only ; meningococcus ferments glucose and maltose ; other Gram-negative diplococci usually ferment either all or none of these sugars, but may rarely give the same reactions as the gonococcus. At the same time, therefore, an ordinary agar slope is inoculated and left at room temperature or put in an incubator at 22° C. Most of the catarrhalis group grow under such conditions : the gonococcus never does. The gonococcus may grow on ordinary digest agar at 37° C. and therefore this textbook test should not be used.

It is felt that these more rigid tests of fermentation reactions and growth at 22° C., which necessitate the isolation of the gonococcus in pure culture, should, if possible, be done for the primary diagnosis of gonococcal vulvo-vaginitis. The difficulty sometimes experienced in isolating the organism from mixed culture and the delay in sending a bacteriological report are disadvantages which cannot outweigh the value of definitely identifying the gonococcus as the causal organism.

APPENDIX III

SUGGESTED INSTRUCTIONS FOR THOSE IN CHARGE OF WARDS FOR SICK CHILDREN AND NURSERIES FOR HEALTHY CHILDREN

1. *Detection.*—The vulva and anal region of every female child under the age of fourteen must be inspected on admission, and a note of the condition entered on the case paper. Subsequent to admission a careful look-out should be kept for vaginal discharge.

2. *Isolation.*—If a discharge is found, the child must be immediately isolated from all other unaffected female children, and a bacteriological examination made at once.† The child may be barrier nursed in an adult female ward. Specimens for bacteriological examination should be taken at once from the vagina.

Smears and swabs for culture should be taken from the urethra and rectum only in proved gonococcal cases or in patients suspected of past or present gonococcal infection or where there are signs of infection of those regions.

3. *Contacts.*—Contacts, *i.e.*, all the female children in the ward *unit* in which the suspected case has occurred, must be examined clinically without delay.

---

* This must be freshly prepared or stored in 1 c. cm. sealed ampoules to prevent auto-oxidation.

† In the infectious diseases hospitals " barrier nursing " of the case may be substituted, at the discretion of the medical superintendent, for removal from a children's ward.

Bacteriological examination should be made only if there is any evidence of vulvo-vaginitis, in which case the child must be isolated as under (2).

The clinical examination of contacts must be repeated daily until the bacteriological examination of the original suspected case is completed.

If the original case proves to be non-gonorrheal, systematic clinical examination can be discontinued but the nurses must maintain the constant vigilance which is always necessary.

If the original case proves to be gonorrheal a bacteriological examination of the contacts must be made at once and the clinical examination continued daily.

The bacteriological examination must be repeated if any further case develops and a final bacteriological examination of all the contacts must be made eight days after the last case has been discovered in the ward.

4. *Quarantine.*—Immediately a suspected case occurs in a ward all admissions to and discharges from the ward must cease until either the case is proved to be non-gonorrheal or the ward has been free of infection for ten days.

5. *Nursing of affected children.*—(*a*) Certificated nurses only shall be employed in the care of affected children *until* three negative swabs have been obtained in a period of not less than a week, and the condition is considered to be non-gonococcal on clinical grounds. (See footnote * below.) Nurses employed in the care of affected children must not, while so employed, attend to unaffected children, but they may with suitable precautions attend to adult patients.

(*b*) Every affected child should have a separate bed-pan or chamber, unless provision is available for efficient sterilization of such utensils after use.

(*c*) Special attention should be paid to the clothing of infected children. When the discharge is profuse, a light pad of non-irritating material is advisable so as to minimise friction. All infected clothing should be soaked in a suitable disinfectant before being sent to the laundry.

(6) *Nursing of non-affected children.*—The following nursing points are mentioned for general guidance in the care of *all* female children :—

(i) *The nurse must thoroughly wash her hands* with soap and water after attending to the toilet of the child. It must be remembered that if rubber gloves are worn they may engender a false sense of security and so lead to neglect of washing.

(ii) *The nurse's overall or apron* may carry infection especially when she puts the child on her lap. It must be protected by a square of mackintosh, a separate one being reserved for each child. The mackintosh must be thoroughly cleansed with an antiseptic before and after use. Towels used for any child must be reserved for that child alone and should be thoroughly dried after use.

(iii) *Temperature.*—Each child should have a separate thermometer. If this is not possible, the patient's temperature should be taken either in the axilla or the mouth, and in no circumstances must it be taken in the groin, vagina, or rectum.

(iv) *Baths.*—The use of a bath with running water laid on diminishes considerably the risk of the spread of infection. As mentioned in paragraph (6) (ii) above, the mackintosh on which the child is seated, together with the towel used for drying, must be reserved for that child alone. After completion of the toilet, it is also advisable to use dusting powder in order to assist in maintaining dryness of the vulval region.

(v) *W.C.'s, bed-pans and chambers.*—With regard to W.C.'s generally, they should be regarded as a possible source of infection, more particularly those with high seats which involve climbing. The divided seat is more satisfactory. It is desirable to emphasise the paramount importance of thorough cleansing of the bed-pan, chamber or W.C. seat with a suitable antiseptic.

(vi) *Bedmaking.*—No infant or child should, in any circumstances, be allowed upon another's cot.

---

* In the infectious diseases hospitals " barrier nursing " of the case may be substituted, at the discretion of the medical superintendent, for removal from a children's ward.

22503182917